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Winter Calf Grazing and Field Windbreaks

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Summary

A grazing trial during the winter of 1994-95 was conducted to determine if conifer windbreaks would reduce cold stress on calves grazing grain sorghum residues as measured by increased calf gain. Daily gains were similar between calves grazing protected and unprotected fields. Calves used the natural surroundings and topography of the land to minimize cold stress, however, tree windbreaks provided an easy access to shelter. Windbreaks did not improve calf performance during a normal to mild winter but they may be advantageous during a more severe winter.

Introduction

Windbreaks have been recommended as shelter for wildlife, minimizing erosion, trapping of snow, and protection for livestock and humans. Windbreaks have been shown to benefit crop production by increasing grain yield. Protection from windbreaks extends 10 to 12 times the height of the windbreak on the leeward side and three to five times on the windward side. Windbreak benefits depend on the height, density, number of rows, species, length, orientation, and maturity of the windbreak.

In Nebraska, the grazing of crop residues in the winter provides an inexpensive source of feed for growing calves. However, cold and wet winter conditions can affect the performance of the cattle. Livestock in adverse winter conditions may consume more feed, however, the energy is likely used to meet maintenance needs and is not available for productive processes, such as daily gain. A combination of temperature, moisture, and wind velocity can severely affect livestock performance during winter including reduced grazing time and reduced intake.

The objectives of this trial were 1) to compare the performance of calves grazing grain sorghum residue in protected and unprotected field conditions, and 2) to determine the influence of conifer field windbreaks on livestock grazing habits.

Procedure

Grazing Trial

Sixty eight weaned crossbred steers (483 lb) were randomly assigned to one of five grain sorghum fields, with three fields having conifer windbreaks and two fields being unprotected. The protected fields had north:south 40 ft conifer windbreaks; thus the east protected field had a windbreak on the west side, the middle protected field had a windbreak on the west and east side, and the west protected field had a windbreak on the east side. The topography of the protected west field had slightly rolling hills, the east and middle protected fields were flat with slight depressions. The topography of one of the unprotected fields was very long with slight depressions, the other unprotected field was rolling with larger depressions. The protected fields were fenced (trees on the outside)to prevent cattle from having access to the tree rows.

Grain sorghum residue from each field was sampled by taking four 15 x 2.5 ft strips. Leaves were separated to determine the amount of available forage (leaf material) in each field. The leaves were analyzed for crude protein, in vitro dry matter digestibility, and neutral detergent fiber (Table 1). Stocking rates were calculated on the available pounds of leaf dry matter per acre, resulting in a stocking rate of 1.0 animal per acre for the protected fields and .76 animal per acre for the unprotected fields (Table 2). Each field had three anemometers placed in the middle of the field spaced equally apart; 256 sq ft cages were put around each anemometer to protect them from the livestock. A protein supplement was fed to all treatments at 1.5 lb/hd/day (DM basis). The cattle were turned out November 22, 1994 and removed February 3, 1995. Anemometers were observed throughout the length of the trial. The average wind speed recorded at the nearby meteorology site was 6.6 mph. Wind direction was obtained from the University weather station at Mead. Observations and walks through the fields were conducted to observe where the cattle were bedding in relation to the windbreaks or slopes of the fields.

Results

The amount of leaf material was greater ($P < .10$) in the protected fields compared with the unprotected fields (Table 1). The higher available forage in the protected fields may be attributed to the ability of the windbreaks to improve moisture use by the sorghum plant.

The daily gains for the cattle did not differ ($P > .10$) between the protected and unprotected treatments (Table 2). The similarity in gain for the two treatments during the winter grazing season could be that the grazing cattle were able to find shelter whether it was by a windbreak or a low area in the pasture to reduce the windchill effects. Fences that were around unprotected field may have provided some shelter and the grain sorghum plants also may have provided some shelter. It also appears that the cattle were bedding down by

Table 1. Grain and leaf yield and chemical composition of leaf samples

	Protected	Unprotected	SE
Grain yield, bu/acre[a]	157	123	15
Leaf yield, lb/acre[b]	1970	1491	135
Crude protein, %	13.0	12.1	.9
IVDMD	49.0	49.3	1.0
NDF	69.5	73.0	1.5

[a]protected > unprotected (P<.2).
[b]protected > unprotected (P<.10).

Table 2. Calf performance, stocking rates, and wind speed measurements

	Protected	Unprotected	SE
Initial wt, lb	482	484	1
Final wt, lb	528	530	16
ADG, lb	.59	.59	.2
Stocking rate, head/acre	1.00	.76	.1
Acres	15.0	11.5	1.1
Windspeed, mph	3.6	4.4	.2

the anemometer cages for protection in both the protected and unprotected fields.

Wind speed measurements, using the anemometers in the fields, indicated that the average wind speed for the protected fields was lower ($P<.01$) than the unprotected fields (Table 2). The average wind direction was evenly split coming from the northwest, northeast, and the southwest. Average temperature was 26.5° F for the trial which is below the critical temperature for cattle with a winter coat.

For November to February in eastern Nebraska, the 30-year average temperature is 24.5° F, wind speed is 11.2 mph, and precipitation is 2.16 inches. The winter had a few occasional cold periods and precipitation levels causing the cattle to become cold stressed; however, over the total 78 days, winter conditions were simi-lar to or milder than the 30-year averages resulting in the calves not being exposed to constant cold stress. When grazing grain sorghum residue, performance of calves may not be improved by windbreaks under average winter conditions. Observations of the fields showed that steers used the topography of the land for shelter. Windbreaks around fields certainly helped the calves find easy shelter and allowed more uniform grazing on windy days. If weather conditions were more severe for longer periods of time, the windbreaks may have provided a constant shelter for calves and improved grazing patterns and calf gains.

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